

WHAT IS CLAIMED IS:

1. A conveyor system for use in a vacuum processing apparatus, comprising:

a cassette mount unit for receiving plural substrates to be processed, wherein said cassette mount unit is exposed to the air;

a conveyor loader having a first conveyor unit for conveying a substrate to be processed;

a load lock chamber for receiving said substrate to be processed from said first conveyor unit;

an unload lock chamber for delivering said substrate to be processed, which has been processed, to said first conveyor unit, wherein said unload lock chamber is a separate chamber from said load lock chamber; and

a vacuum conveyor load unit, having a conveyor chamber, comprising a second conveyor unit, which conveys said substrate to be processed between said load lock chamber or said unload lock chamber and at least one of a plurality of vacuum processing chambers,

wherein said conveyer loader is disposed in front of a front wall of the load lock chamber and the unload lock chamber, between the cassette mount unit and the two lock chambers.

2. A conveyor system for use in a vacuum processing apparatus, comprising:

a cassette mount unit for receiving plural substrates to be processed;

a conveyor loader having a first conveyor unit for conveying a substrate to be processed;

a load lock chamber for receiving said substrate to be processed from said first conveyor unit;

an unload lock chamber for delivering said substrate to be processed, which has been processed, to said first conveyor unit, wherein said unload lock chamber is a separate chamber from said load lock chamber, and wherein the first conveyor unit passes the substrate in a first direction when conveying the substrate to be processed to the load lock chamber and passes the substrate in a second direction opposite the first direction when passing the substrate from the unload lock chamber; and

a vacuum conveyor load unit, having a conveyor chamber, comprising a second conveyor unit, which conveys said substrate to be processed between said load lock chamber or said unload lock chamber and at least one of a plurality of vacuum processing chambers,

wherein said conveyor loader is disposed in front of a front wall of the load and unload lock chambers, between the cassette mount unit and the two lock chambers.

3. A conveyor system according to claim 2, wherein said cassette mount unit is exposed to the air.

4. A conveyor system for use in a vacuum processing

apparatus, comprising:

a cassette mount unit for receiving plural substrates to be processed, and for receiving substrates which have been processed;

a conveyor loader having a first conveyor unit for conveying a substrate to be processed;

a load lock chamber for receiving said substrate to be processed from said first conveyor unit;

an unload lock chamber for delivering said substrate to be processed, which has been processed, to said first conveyor unit, wherein said unload lock chamber is a separate chamber from said load lock chamber, and wherein the cassette mount unit is positioned in front of a front wall of the load lock chamber or the unload lock chamber; and

a vacuum conveyor load unit, having a conveyor chamber, comprising a second conveyor unit which conveys said substrate to be processed between said load lock chamber or said unload lock chamber and at least one of a plurality of vacuum processing chambers,

wherein said conveyor loader is disposed in front of a front wall of the load and unload lock chambers between the cassette mount unit and the load and unload lock chambers.

5. A conveyor system for use in a vacuum processing apparatus, comprising:

a transfer robot arranged so as to access plural cassettes and plural lock chambers;

a cassette table arranged to direct a wafer takeout

port of said plural cassettes toward a side of said transfer robot, wherein the cassette table is located so as to position the cassettes in front of front walls of the plural lock chambers;

the plural lock chambers having gate valves directed toward said transfer robot; and

a vacuum buffer chamber having plural gate valves which are disposed to enable plural vacuum processing chambers to be connected at a surrounding portion with the plural lock chambers,

wherein said transfer robot is disposed in front of a front wall of the plural lock chambers between the cassette table and the plural lock chambers, wherein each of the lock chambers is provided with both an inlet and an outlet located in a horizontal line and has an interior space sufficient to store one wafer,

wherein another robot is provided with an arm extendable into the double lock chambers and across inlets to the plural vacuum processing chambers.

6. Apparatus for carrying out a method including steps of:

(i) placing a cassette containing wafers to be processed at a cassette table which is in the atmosphere;

(ii) loading said wafers sequentially in order from said cassette by means of a conveyor and a load lock chamber; and

(iii) unloading processed wafers by means of an

unload lock chamber and said conveyor in the atmosphere,

said apparatus comprising:

the cassette table, exposed to the air, for disposing cassettes containing wafers to be processed, the cassettes being disposed in a single row in front of the load and unload lock chambers;

the load and unload lock chambers, in which wafers are transferred from the atmosphere to vacuum and from vacuum to the atmosphere; and

the conveyor, adapted to load wafers sequentially between a cassette at said cassette table and said load and unload lock chambers and to unload processed wafers sequentially between said load and unload lock chambers into said cassette, at said cassette table, from which the wafers had been loaded into said load and unload lock chambers,

wherein said conveyor is disposed in front of a front wall of the load and unload lock chambers between the cassette and the load and unload lock chambers, and

wherein each of the lock chambers is provided with both an inlet and an outlet located in a horizontal line and an interior space sufficient to store one wafer.

7. A vacuum processing apparatus, comprising:

a loader, exposed to the air;

a vacuum loader; and

a lock chamber for connecting said loader and said vacuum loader, wherein

said loader includes a cassette mount unit located

outside of said lock chamber, and

said cassette mount unit has a cassette positioning plane in which all cassettes, containing samples to be processed, exposed to the air, are positioned in a single row in front of a front wall of said lock chamber,

wherein said loader is disposed in front of a front wall of the lock chamber between the cassette mount unit and the lock chamber, and

wherein the lock chamber is provided with gate valves respectively at both an inlet and an outlet located in a horizontal line.

8. A vacuum processing apparatus, comprising:
 - a first loader, to be operated at atmospheric pressure,
 - a second loader to be operated at a vacuum; and
 - a lock chamber for connecting said first loader and said second loader,

wherein:

said first loader includes a cassette mount unit located outside of said lock chamber,

said cassette mount unit has a cassette positioning plane in which all cassettes, containing substrates to be processed, and exposed to the air, are positioned in a single row in front of a front wall of said lock chamber,

the first loader is disposed in front of a front wall of the lock chamber between the cassette mount unit and the lock chamber, and

the lock chamber is provided with both an inlet and an outlet located in a horizontal line and has an interior space sufficient store one substrate.

9. A vacuum processing apparatus, comprising:

a first loader, to be operated in an atmosphere different from an atmosphere in a vacuum processing chamber,
a second loader to be operated in said atmosphere in said vacuum processing chamber; and

a lock chamber for connecting said first loader and said second loader,

wherein:

said first loader includes a cassette mount unit located outside of said lock chamber,

said cassette mount unit has a cassette positioning plane in which all cassettes, containing substrates to be processed, and exposed to the air, are positioned in a single row in front of a front wall of said lock chamber,

the first loader is disposed in front of a front wall of the lock chamber, between the cassette mount unit and the lock chamber, and

the lock chamber is provided with both an inlet and an outlet located in a horizontal line and has an interior space sufficient to store one substrate.

10. A vacuum processing apparatus, comprising:

a first loader, to be operated in an atmosphere,
a second loader to be operated in a vacuum; and

a lock chamber for connecting said first loader and said second loader,

wherein:

said first loader includes a cassette mount unit located outside of said lock chamber,

said cassette mount unit has a cassette positioning plane in which all cassettes, containing substrates to be processed, and exposed to the air, are positioned in a single row in front of a front wall of said lock chamber,

the first loader is disposed in front of a front wall of the lock chamber between the cassette mount unit and the lock chamber, and

the lock chamber is provided with both an inlet and an outlet located in a horizontal line and an interior space sufficient to store one substrate.

11. A vacuum processing apparatus, comprising:

a loader, exposed to a cassette transferring atmospheric pressure;

a vacuum loader; and

a lock chamber for connecting said atmospheric loader and said vacuum loader,

wherein:

said loader includes a cassette mount unit located outside of said lock chamber,

said cassette mount unit has a cassette positioning plane in which all cassettes, containing samples to be processed, exposed to the air, are positioned in a single row

in front of a front wall of said lock chamber,

the loader is disposed in front of a front wall of the lock chamber between the cassette mount unit and the lock chamber, and

the lock chamber is provided with gate valves respectively at both an inlet and an outlet located in a horizontal line.

12. A vacuum processing apparatus, comprising:

plural vacuum processing chambers in which substrates to be processed are vacuum processed one-by-one;

a transfer chamber connected to said plural vacuum processing chambers;

a cassette table for mounting in air a cassette which receives plural substrates to be processed or substrates having been processed;

a load lock chamber and an unload lock chamber, for respectively carrying in and carrying out said substrates to be processed or said substrates having been processed between said cassette in the air and a respective lock chamber, and for respectively carrying in and carrying out said substrates to be processed or said substrates having been processed between any of said vacuum processing chambers and a respective lock chamber through said transfer chamber;

one atmospheric transfer apparatus for transferring and substrates to be processed or said substrates having been processed between said cassette in the air and said load lock chamber and said unload lock chamber; and

gate valves provided respectively at an atmospheric said and a vacuum side of said load lock chamber and said unload lock chamber, for opening and closing at every carry-in and carry-out time of said substrates to be processed or said substrates having been processed, so as to change over said load lock chamber and said unload lock chamber to an atmospheric atmosphere or a vacuum atmosphere,

wherein between said load lock chamber or said unload lock chamber and said cassette in the air, said substrates to be processed or said substrates having been processed are carried in and carried out one-by-one, and said atmospheric transfer apparatus is disposed in front of a front wall of the load lock chamber and the unload lock chamber, between (1) the cassette, and (2) the load lock chamber and the unload lock chamber.

13. A vacuum processing apparatus according to claim 12, wherein said substrates to be processed or said substrates having been processed are carried in and carried out one-by-one between said load lock chamber or said unload lock chamber in the atmospheric atmosphere and said cassette in the air.

14. A vacuum processing apparatus according to claim 13, wherein said substrates to be processed or said substrates having been processed are carried in and carried out one-by-one between said load lock chamber or said unload lock chamber in the vacuum atmosphere and the transfer chamber in the vacuum atmosphere.

15. A vacuum processing apparatus according to claim 13, wherein said substrates to be processed or said substrates having been processed are carried in and carried out one-by-one between said load lock chamber and the unload lock chamber in the vacuum atmosphere and the cassette in the air.